Second Five-Year Review Report

for

Kin-Buc Landfill Superfund Site

Edison Township, Middlesex County, New Jersey

Prepared by:

U.S. Environmental Protection Agency
Region II
New York, New York

September 2004

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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
ESD	Explanation of Significant Difference
HHRA	Human Health Risk Assessment
NJDEP	New Jersey Department of Environmental Protection
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund amendments & Reauthorization Act
SDWA	Safe Drinking Water Act
VOC	Volatile Organic Compound

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name (from WasteLAN): Kin-Buc Landfill Superfund Site

EPA ID (from WasteLAN): NJD049860836

Region: 2	**State:** NJ	**City/County:** Edison Township/Middlesex County

SITE STATUS

NPL Status: ■ Final ☐ Deleted ☐ Other (Specify)

Remediation Status (choose all apply): ☐ Under Construction ■ Constructed ■ Operating

Multiple OUs? ■ Yes ☐ No | Construction Completion Date : 1/29/1996

Has site been put into reuse? ☐ Yes ■ No ☐ N/A

REVIEW STATUS

Lead Agency: ■ EPA ☐ State ☐ Tribe ☐ Other Federal Agency

Author Name: Grisell V. Díaz-Cotto

Author Title: Remedial Project Manager | **Author Affiliation:** EPA

Review Period: 01/1/1999 to 12/30/2003

Date(s) of Site Inspection: 03/18/2004

Type of Review: ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal ☐ Non-NPL Removal Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion ■ Statutory

Review number: ☐ 1 (first) ■ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering action:

☐ Actual RA Onsite Construction at OU#___ ☐ Actual RA Start at OU#_____
☐ Construction Completion ■ Previous Five-Year Review Report
☐ Other (specify)_____

Triggering action date (from WasteLAN): 03/3/1999

Due date (five years after action date): 03/3/2004

Does the report include recommendation(s) and follow-up action(s)? ☐ yes ■ no
Is human exposure under control? ■ yes ☐ no
Is the contaminated groundwater under control? ■ yes ☐ no
Is the remedy protective of the environment? ■ yes ☐ no

Five-Year Review Report

I. Introduction

Authority. The Agency is preparing this five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the president that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirements further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

This second five-year review for the Kin-Buc Landfill Superfund Site, located in Edison Township, Middlesex County, New Jersey, was conducted by United States Environmental Protection Agency (EPA) Remedial Project Manager (RPM), Grisell V. Díaz-Cotto. This review covers the inclusive dates of January 1999 to December 2003. The five-year review was conducted in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of five-year reviews is to assure that implemented remedies protect human health and the environment and that they are functioning as intended by the decision documents. This report will become part of the site file. Reports pertinent to this five-year review are listed in the references section of the report.

This is the second five-year review for the Kin-Buc Landfill Superfund Site. The triggering action for this review is the completion of the first five-year review on March 3, 1999.

II. Site Chronology

Table 1 (attached) summarizes the site related events from discovery to the first five-year review.

III. Background

Site Location and Description:

The Kin-Buc Landfill Superfund site is located at 383 Meadow Road, Edison Township, Middlesex County, New Jersey. The site, which consists of several inactive disposal areas, occupies approximately 220 acres and is bordered by the Edison Township Landfill (approximately 600 feet to the south), on the east by wetlands and the inactive ILR landfill

(approximately a mile away), on the west by the Raritan River, and on the north by the Edison Salvage Yard, the Edison Township boat launch, and a chemical manufacturing plant. The Edgeboro Landfill is located approximately 0.5 miles away across the Raritan River southwest from the Kin-Buc and Edison landfills. The Heller Industrial Park, a light-industrial and commercial complex, is located approximately one mile to the north of the site.

Topography:

The Kin-Buc I mound covers approximately 30 acres and rises to a maximum elevation of approximately 93 feet above mean sea level (MSL). The Kin-Buc II mound, just north of Kin-Buc I, covers about 12 acres and rises to approximately 51 feet above MSL. Mound B covers approximately nine acres along the shoreline of the Raritan River with an elevation of approximately 15 to 20 feet above MSL.

Geology/Hydrogeology:

There are four stratigraphic units present at the site (top to bottom): refuse fill; meadow mat; sand-and-gravel; and bedrock.

The site is underlain by sedimentary rocks of Triassic Age, the Brunswick Formation and the Lockatong formation. These formations consist chiefly of siltstone, mudstone and shale, and occur at depths ranging between 25 and 46 feet below the area. A sand-and-gravel unit, representing recent Raritan River channel fill, overlies the bedrock locally at an average thickness of 16 feet. Within Mound B and the Low-lying area, a layer of organic-rich clay and silt known as "meadow mat" overlies the sand-and-gravel deposit at an average thickness of seven feet. A refuse layer of varying thickness (between seven and 24 feet) overlies the meadow mat deposit. The refuse contains relatively old waste materials, such as household and municipal solid waste, debris, white goods (household appliances), industrial wastes and fill materials. This layer is overlain by clay over Mound B and a layer of cover soil over Mound B and the Low-lying area.

All four stratigraphic units are water-bearing, although only the bedrock unit is regionally extensive and used for water supply. In the refuse layer, groundwater flows radially from the Kin-Buc I mound toward the Pool C area, the Edison landfill, and the Raritan River, and is not tidally influenced by the river. The underlying meadow mat layer acts as a semi-confining layer; its fine-grained organic-rich matrix exhibits very low permeability, indicating that groundwater does not readily flow in this unit either vertically or laterally. The sand-and-gravel unit is in direct hydraulic contact with the river, and is therefore affected by tidal influence. At low tide, groundwater in this unit flows across the site from southeast to northwest. At high tide, this flow is reversed when groundwater flows from Mound B toward the Low-lying Area. However, net flow is west, towards the river. Groundwater flows in the bedrock unit towards the south. However, where bedrock is directly overlain by the sand-and-gravel unit, bedrock flow is tidally influenced, causing a general oscillation of flow in the Mound B and Low-lying areas. Vertical gradients within the four units indicate that net discharge from these units is to the Raritan River, either directly or indirectly. The refuse and sand-and-gravel units discharge directly into the Raritan River at high and low tides, respectively, while the bedrock unit discharges upward into the sand-and-gravel unit, from which groundwater discharges to the river.

Land and Resource Use:

The Kin-Buc Site is located within an industrial and commercial area of Edison Township, which is zoned for light industry. Some residences are located between one and a half and two miles to

the north of the site. No drinking water supply wells, municipal or private, are located within a two-mile radius of the site. Upstream of the site, the city of New Brunswick withdraws water from the Weston's Mill Pond, which is fed by the Lawrence Brook, a tributary to the Raritan River which enters the river from the west, and the Delaware and Raritan Canal.

History of Contamination:

Landfilling began at the site in about 1947, accepting municipal, industrial, and hazardous waste. Kin-Buc, Inc. began operating the site in 1968. Between 1971 and 1976, Kin-Buc, Inc. operated the site as a state-approved landfill for industrial (solid and liquid) and municipal wastes. Hazardous wastes were disposed in the main landfill mound, Kin-Buc I, as well as in Kin-Buc II. EPA estimates, on the basis of owner-operator records, that approximately 70 million gallons of liquid waste and at least one million tons of solid waste were disposed of at Kin-Buc between 1973 and 1976. In 1976, the New Jersey Department of Environmental Protection (NJDEP) revoked Kin-Buc's permit to operate because of violations of both state and federal environmental statutes. Little is known of the waste disposal history of Mound B, other than the fact that primarily municipal wastes were buried in the Mound.

The landfilled areas associated with the site are the Kin-Buc I and Kin-Buc II mounds; an area east of Kin-Buc I referred to as Pool C; the Low-Lying Area, which begins just south of Kin-Buc I; and, Mound B, which is on the Raritan River south and west of Kin-Buc I and the Low-Lying Area. The following adjacent areas have also been affected by contaminant migration from the site: Edmonds Creek, the wetlands associated with Edmonds Creek, and Mill Brook/Martins Creek.

Initial Response:

EPA's involvement with the site began in 1976 during investigation of an oil spill at the site, which revealed discharge of hazardous substances from the facility. EPA filed initial charges against the owner-operators in 1979, under such statutes as the Water Pollution Control Act, and the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA). Under a 1980 partial settlement, Kin-Buc, Inc. (and not the other defendants) agreed to install a landfill cap and initiate a long-term monitoring program, but not to remediate the site or control the further migration of contaminants in the area. Therefore, in 1980, EPA began cleanup activities under Section 311 (k) of the Clean Water Act, collecting aqueous and oily leachate from the Pool C area for treatment and disposal.

In September 1983, the site was added to the National Priorities List (NPL).

Basis for Taking Action:

Operable Unit 1. The RI identified highly contaminated landfill leachate and groundwater contamination emanating from the refuse in the Kin-Buc I and Kin-Buc II mounds, containing volatile organic compounds (VOCs), metals, pesticides, and polychlorinated byphenyls (PCBs). These constituents appeared to have migrated from the Kin-Buc I and Kin-Buc II mounds toward the Low-Lying Area, Mound B, and the Raritan River to the west, and Pool C and the Edmonds Creek marsh to the east. The RI also concluded that the landfill closure efforts were inadequate and that releases from the source areas were continuing. A ROD for this unit was issued in September 1988. OU1 consists of the following components: Kin-Buc I and II, Pool C, and the Low-lying area between Kin-Buc I and the Edison Landfill.

Operable Unit 2. The second operable unit (OU2) included adjacent areas affected by

contaminant migration from the landfill and was focused on evaluation that nature and extent of groundwater contamination in the Low-lying Area and Mound B; wetlands contamination in the Edmonds Creek/Marsh system; and, surface water contamination in Edmonds Creek and Mill Brook/Martins Creek. The OU1 ROD required that an RI/FS be conducted for these OU2 areas.

The OU2 ROD was signed in September 1992.

Contaminants:

Contaminants were found in the refuse unit leachate, as well as in groundwater from the sand-and-gravel unit and, at very low levels, in the bedrock aquifer. Leachate in the refuse unit contains volatile organic compounds (VOCs), base-neutral/acid extractable compounds (BNAs), metals and pesticides, and polychlorinated byphenyls (PCBs), these being similar to the contaminants found emanating from Kin-Buc I and Kin-Buc II. The sand-and-gravel unit contained similar VOCs and BNAs as were found in the refuse unit, although at lower concentrations. These constituents also appear to have migrated from the landfill mounds. The bedrock unit contained very low levels of VOCs, which may also be attributed to migration from Kin-Buc I.

While Table 8 of the OU2 ROD identified 16 Chemicals of Concern in the sediments, surface water and groundwater, including VOCs, PAHs, Phthalates, Pesticides, PCBs, and metals, the OU2 ROD only established one cleanup goal of 5 ppm PCBs in sediments. The rationale behind this decision was that the implementation of source control, provided for in the OU1 remedial action, would be sufficient to prevent further migration into the environment. In addition, contaminants which have already migrated into the groundwater would be gradually reduced by natural attenuation to acceptable levels.

IV. Remedial Actions

OU1 Remedy Selection:

The EPA issued the first of two RODs for the site on September 30, 1988. This first ROD divided the site into two remedial phases known as operable units: Operable Unit 1 (OU1) consists of the Kin-Buc I and II mounds, as well as portions of the Low-Lying Area (between Kin-Buc I and the Edison Landfill) and Pool C. The selected remedial action for OU1, intended to provide source control for the landfill mounds, consisted of the following components:

- installation of a circumferential slurry wall to bedrock on all of the sides of the site;
- maintenance, and upgrading if necessary, of the Kin-Buc I cap and installation of a cap in accordance with RCRA Subtitle C and State requirements on Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C;
- collection and off-site incineration of oily phase leachate;
- collection and on-site treatment of aqueous phase leachate and contaminated groundwater with disposal via direct surface water discharge;
- periodic monitoring; and
- operation and maintenance.

OU1 Remedy Implementation:

The OU1 Remedial Action construction was initiated in June 1993. The slurry wall and landfill cap were substantially completed in May 1995, and the leachate collection and groundwater treatment system started operation in April 1995. A Remedial Action Report for the OU1 remedy was approved by EPA on June 18, 1996. An addendum to this Remedial Action Report, (covering a portion of OU1 known as the Oil Seeps Area) was approved on May 9, 1997.

OU2 Remedy Selection:

On September 28, 1992, EPA issued the ROD for OU2. OU2 consisted in adjacent areas impacted by contaminant migration for the landfill mounds. These areas were the remaining of the Low-Lying Area and Mound B; wetlands contamination in the Edmonds Creek/Marsh system; and surface-water contamination in Edmonds Creek and Mill Brook/Martins Creek.

The major components of the remedy selected under the 1992 ROD for OU2 were:

- the excavation of an estimated 2,200 cubic yards of sediments with Polychlorinated Byphenyls (PCBs) at levels greater than 5 parts per million (ppm);
- consolidation of the excavated sediments within the OU1 containment system;
- restoration of wetlands areas impacted by the excavation of contaminated sediments; and
- long-term monitoring of ground and surface water to ensure the effectiveness of the remedy.

OU2 Remedy Implementation:

The Remedial Action for OU2 was initiated in June 1994. Approximately 9,400 cubic yards of PCB-contaminated sediments were excavated from five separate zones located within the Edmonds Creek/Marsh system where PCB concentrations exceeded the cleanup goal of 5 ppm. The excavated sediments were placed within the OU1 slurry wall, and the wetland areas were then restored. A Remedial Action Report for the OU2 Remedial Action was approved by EPA on January 29, 1996.

During the construction of the OU1 remedy, buried drums were detected in Mound B, an area not previously thought to be used for hazardous waste disposal. Consequently, EPA conducted a further investigation, which lead to the excavation and removal of drums containing suspected hazardous materials. The details of this investigation and subsequent response action are memorialized in an Explanation of Significant Differences (ESD), issued in 2001, which is a document that addresses and documents changes that occur to a remedy after a ROD is signed.

System Operations/Operation and Maintenance (O&M):

Operation and Maintenance (O&M) for both OU1 and OU2 encompass the following activities:

- aqueous phase leachate/groundwater collection and treatment system;
- groundwater/surface water monitoring
- landfill gas monitoring;
- restoration and mitigation monitoring for two separate wetland areas;
- and biota monitoring in the Edmonds Creek area.

The start dates for these activities span from April 1995 (start of collection and treatment plant systems) to April 1998 (the beginning of OU1 wetlands mitigation monitoring).

The O&M program serves several purposes, among which are:

- to provide hydraulic containment (inward gradient) within the perimeter of the slurry wall (OU1);
- to assess the hydraulic performance of the slurry wall;
- to monitor offsite gas migration;
- and, by the scheduled sampling of the leachate influent, effluent, and of the groundwater, to assess whether the remedy is working properly.

The primary objectives of the 1988 and 1992 RODs are to control the source of contamination at the site, to mitigate any off-site impacts resulting from migration of contaminants, and to minimize any potential human health and ecological impacts resulting from the exposure to contamination at the site. To evaluate the effectiveness of the remedial actions, a long-term program for the monitoring of water quality and landfill gas was designed. The long-term monitoring program, which started in January 1996, included, for OU1, the installation of wells on either side of the slurry wall to monitor water quality and elevations in the three different hydrogeologic units (refuse, sand and gravel, and bedrock), plus the monitoring of off-site gas migration in those areas where gas migration or accumulation could cause potential problems. The OU2 groundwater and surface water network also provided for water quality monitoring in the three water-bearing zones. In addition, wetlands monitoring (for OU1 and OU2) along with biota monitoring requirements (for OU2) are also part of the remedy.

The parameters to monitor and the frequency of monitoring were as follows: once a year all monitoring wells, as well as surface water locations, were tested for volatiles, semi-volatiles, pesticides/PCBs, dissolved metals, and chemistry (pH, BOD, COD, turbidity, etc.); the other three quarters only some of the dissolved metals and chemistry parameters were tested. However, gas monitoring wells were tested quarterly through the whole year for percent combustible gas per volume (%GAS) and percent lower explosive limit (%LEL). Hydraulic monitoring (to assess the hydraulic performance of the slurry wall, the desirable inward and upward flow conditions) was also to be conducted on a quarterly basis.

In addition, aqueous leachate (from the refuse zone) and groundwater (from the meadow mat) are extracted from several well locations and pumped to the Leachate Treatment Plant where it is treated to meet effluent limitations before discharging to the Raritan River. Waste oil (non aqueous leachate) is not treated but is hauled for off-site disposal.

In February 1998, EPA agreed to the PRP's petition for changing the frequency of the groundwater and surface water monitoring program (from a quarterly to an annual basis) along with changes to the parameter list, including the addition of monitoring of groundwater geochemical parameters. This change was approved after evaluating the appropriateness of the existing monitoring program for detecting changes in water quality attributable to the completion of major components of the selected remedies for both operable units. The addition of the groundwater geochemical parameters was necessary to adequately assess the long-term changes (trends) in the chemistry of groundwater in and around the landfill.

V. Progress Since the Last Review

This is the second five-year review for the site. The previous five-year review identified concerns with the following remedy components: OU2 Wetlands Restoration and Biota Monitoring Programs as well as with Mound B.

Wetlands and Biota. Edmonds Creek is an impacted waterway as a result of its proximity to a variety of water contaminant sources. The Kin-Buc OU2 remedy included sediment removal, wetlands restoration and follow up monitoring. This remedy was intended to reduce the impact of the Kin-Buc sources on the creek, wetlands, as well as the shoreline of the Raritan River.

The OU2 monitoring program was established in the OU2 Remedial Action Report, which was approved by EPA in January 1996 and included two separate monitoring activities: a Wetlands Restoration Monitoring Program (WRMP) and a Biota Monitoring Program (BMP). Each monitoring program required extensive field work and sampling for a period of five years. The purpose of the WRMP was to evaluate the effectiveness of the wetlands restoration that was performed after the remedy was implemented. The purpose of the BMP was to evaluate the overall effectiveness of the OU2 remedy. Both five-year monitoring programs were complete by September 2001 (2000 for the WRMP). The wetland restoration monitoring indicated that the cordgrass (Spartina Alterniflora) planting scheme for the area failed. The biota monitoring indicated that, while the levels of PCBs in sediments in Edmonds Creek were still substantially reduced from pre-remedial levels, measurements of PCBs greater than the cleanup goal of 5 ppm of PCBs had been detected periodically during the five years of monitoring, in addition to the evidence of PCB uptake in the biota of Edmonds Creek.

Given the fact that this monitoring suggested some remaining contamination, EPA has continued ecosystem monitoring in the creek and is considering other methods for investigating the potential for continuing PCB-sources in the marsh area.

Mound B. Mound B remediation was conducted by the PRP following the issuance of the previous five-year review. It consisted mainly of the removal of drums and is discussed in the 2001 ESD.

VI. Five-Year Review Process

Administrative Components:

On February 17, 2004, Waste Management, through their representative and site manager, Carl Januszkiewicz, was notified via electronic mail of the initiation of the five-year review.

The Kin-Buc Landfill Superfund Site Five-Year Review Team was led by Grisell V. Díaz-Cotto, Remedial Project Manager (RPM), Charles Nace, Risk Assessor, and Robert Alvey, Hydrogeologist.

The site inspection took place on March 18, 2004.

Community Notification and Involvement:

The EPA Community Relation Coordinator for the Kin-Buc Landfill Superfund Site, Pat Seppi, published a notice in the *Home News Tribune*, the area newspaper, on February 26, 2004, notifying the community of the initiation of the five-year review process. The notice indicated that upon completion of the five-year review, the document would be available to the public at the Edison Public Library in Edison. In addition, the notice included the RPM's name, address and telephone number for questions related to the five-year review process or the Kin-Buc Landfill Superfund Site in general.

Document Review:

This five-year review consisted of a review of the relevant documents including Operation and Maintenance records and Monitoring Data. Applicable ROD cleanup standards were reviewed as well as current groundwater cleanup standards.

Data Review:

Hydraulic Monitoring. In general, intragradient conditions in the OU1 refuse unit were maintained, and overall, containment of groundwater in OU1 was achieved.

Leachate Withdrawal/Groundwater Pumping. Both groundwater and leachate collection were generally consistent with recommended withdrawal rates.

Landfill Gas Migration Monitoring. There is no apparent offsite gas migration.

Groundwater Sampling and Analysis (VOCs, SVOCs, Pesticides/PCBs, Metals, and General Chemistry for Refuse/Fill, Sand-and-Gravel, and Bedrock Monitoring Wells). In spite of occasional detections of concentrations and/or constituents in all or some of the different units, in general, there are no trends in the water quality data which would indicate that the remedy is not protective.

Surface Water Sampling and Analysis (VOCs, SVOCs, Pesticides/PCBs, Metals, General Chemistry). In spite of occasional detections of concentrations and/or constituents in all or some of the four surface samples, in general, there are no trends in the data which would indicate that the site groundwater is impacting surface water quality.

Leachate treatment plant effluent. The analytical results, as reported in monthly Discharge Monitoring Reports, generally show compliance with the effluent limitations as established in the New Jersey Discharge Elimination System permit equivalency.

Natural Attenuation Monitoring. In general, the data continues to suggest that there is a potential for biodegradation of chlorinated solvents in select areas of OU1 and OU2. However, additional data collection and evaluation is still required to determine the how attenuative is the biodegradation mechanism at the site.

OU1 Wetlands. The monitoring program, which concluded in 2002, showed that the mitigation is progressing.

OU2 Wetlands. The monitoring period expired in 2000, with EPA's conclusion that the planting effort was a failure. However, and given the fact that these restoration areas are concomitant to those included in the Biota Monitoring Program, the PRPs were instructed to hold off on further restoration efforts while the evaluation of any continuing sources of PCB was investigated.

Biota and Sediments. Sediment concentrations greater than the remediation goal of 5 ppm of PCBs, in addition to evidence of biological uptake, continue to be found in portions of Edmonds Creek.

Site Inspection:

The site inspection was conducted on March 18, 2004, by the RPM and members of the Program Support Branch. The purpose of the site inspection was to assess the protectiveness of the

remedy, including the operation of the leachate and groundwater collection system, the treatment plant, the landfill gas monitoring system, and the integrity of the soil covering the mounds as well as the slurry wall.

No significant issues were identified during the inspection.

Interviews:

On March 11, 2004, a meeting took place with members of the Edison Wetlands Association (EWA) to discuss the present status of the site, including an update on the individual remedy components. Besides expressing some concerns, shared by EPA, regarding the monitoring results on one of the study areas (Edmonds Creek), no significant problems regarding the site were identified during the meeting.

VII. Remedy Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Yes. The primary objectives of the Record of Decision are being met. The former landfill has been closed and fully capped, and the cap is maintained in appropriately protective condition. The methane collection system and slurry wall are functioning as intended. The groundwater collection, treatment and disposal system continues to address the source of contamination at the Site.

It is noted that the groundwater treatment system appears to be in very good operating condition and is well maintained. The monitoring well network consists of an adequate number and location of wells to address the site.

There is a sufficient groundwater sampling database available to recommend that the frequency of sampling be re-evaluated. Some wells are difficult to sample due to lack of water, and an assessment should be conducted to determine if the wells need deepening. There may be a slight savings in reducing the frequency of sampling (except for landfill gas) to a biannual basis. The minor presence of semi-volatiles is noted, but do not appear to be a significant item of interest at this point. On occasion, the intragradient conditions in the refuse unit were not fully maintained at the well transects. EPA concurs that overall hydraulic control was maintained, and do not believe this to be a significant issue.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

(a) The exposure assumptions that were used to estimate the potential risks and hazards that may be present at the site could change as science or policies change. These changes could result in increases or decreases to the risks or hazards that were calculated in the human health risk assessment. The exposure assumptions that are typically used have not significantly changed over the past twenty years and the exposure assumptions used in the risk assessment were similar to those that would currently be used. Therefore the calculated risk and hazards associated with the site would only have minor fluctuations and would not result in a different decision being made.

(b) The toxicity values that are used to estimate the potential risks and hazards that may be present at the site could also change as science advances. There were 18 chemicals identified as

contaminants of potential concern with the potential for 72 different toxicity values (i.e., 18 each via oral and inhalation for carcinogenic and noncarcinogenic effects; 18 x 4 = 72), although there were only 29 toxicity values identified in the risk assessment. In contrast, using current toxicity information, there would be 40 toxicity values. This increase is made up of the following; 13 chemicals that did not have a toxicity value for a specific endpoint currently have a value and two chemicals that had a toxicity value currently do not have a value. In addition, three of the chemicals had toxicity values increase, while eleven chemicals had toxicity values decrease. The net result of increasing the number of chemicals with toxicity values and having quite a few toxicity values decrease would be that the calculated risks and hazards would increase. The actual change that this would have regarding the protectiveness of the remedy would be reflected in the cleanup goals identified in section (c) below.

(c) As indicated above, the calculated risks and hazards associated with the site would increase given the current toxicity values, however the actual change in how protective the remedy would be can be judged through evaluating the ARARs and TBCs that were identified as cleanup goals. These cleanup goals were identified in Tables 4-2 and 4-3 in the HHRA (pages 114 and 115). These tables have been regenerated and are included as Tables 3 and 4. The following chemicals, as depicted in the said tables, have had values that have changed since the issuance of the ROD. These new values would be the values that would currently be cited for being acceptable ARARs and TBCs.

(d) The remedial action objectives (RAO) that are presented in the ROD are to reduce risks to human health via ingestion of contaminated fish and to the environment via bioaccumulation of contaminants in aquatic species. No additional RAOs were developed in the ROD, however, it is stated that the implementation of source control provided for in the Operable Unit 1 remedial action will be sufficient to prevent further migration of contaminants into the environment and that contaminants that have already migrated into groundwater will be gradually reduced by natural attenuation to acceptable levels. The RAO and additional statements regarding source control and natural attenuation are still valid at this time.

Changes in Standards and To Be Considered (TBCs)

The ROD required a remediation goal of 5 ppm PCBs in sediments. In addition, it did not establish remedial action objectives for ground or surface water. Nonetheless, the selected remedy was expected to comply with all Federal and State ARARs[1]. While these ARARs and TBCs do not reflect current groundwater standards, 5 ppm PCBs may still be an effective remediation standard for the site because, and as explained above, EPA determined that there were no current or plausible future scenarios which could pose a risk to human health; and therefore these standards are still considered protective. The New Jersey Soil Cleanup Criteria (Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26D)- Impact to Groundwater- was also considered during this five-year review.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

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[1] Federal: RCRA Standards and SDWA MCLS. State: NJAC Standards Class GW2 and SDWA MCLS. TBCs: NJDEPE Proposed GW Cleanup Standards and NJDEPE Proposed GW Quality Standards

Remedy Assessment Summary

With the exception of the Biota monitoring results, as explained before, according to the data reviewed and the site inspection, the remedy is functioning as intended by the ROD.

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Hydraulic Monitoring: The results show that overall, lower hydraulic heads inside the slurry wall (relative to outside of it) are maintained, representing intragradient flow conditions, and therefore minimizing the potential for contaminant migration beyond the slurry wall.

Leachate Withdrawal/Groundwater Pumping: The leachate withdrawal and groundwater pumping rates are generally achieving an upward vertical gradient between the bedrock and the overlying sand-and-gravel deposits, and thus minimizing the potential for vertical migration of contaminants into the bedrock groundwater aquifer. There are no drinking water wells within the contaminated area and none are expected to be installed due to existing state restrictions.

Landfill Gas Migration monitoring: The active gas collection system appears to be functioning properly, and there is no apparent offsite gas migration.

Groundwater Quality: Concentrations of constituents identified in OU1 and OU2 monitoring wells are ordinarily consistent with those identified during previous monitoring events.

Surface Water Quality: Results do not show the site's groundwater to be impacting the surface water.

Leachate treatment plant effluent: In the overall, data show compliance with the effluent limitations as established in the New Jersey Discharge Elimination System Permit Equivalency.

Natural Attenuation Monitoring: In general, the data continues to suggest that there is a potential for biodegradation of chlorinated solvents in select areas of OU1 and OU2.

OU1 Wetlands: The monitoring program, which concluded in 2002, showed that the restoration is progressing.

OU2 Wetlands, Surface Waters, Sediments and Biota: The Kin-Buc site is a large site located in an impacted urban area. The site remedy provided for the containment of site contaminants with the long term expectation of the full recovery of wetlands, surface waters, sediments and biota. The remedy has been implemented and the monitoring indicates that the containment remedy is effective. Monitoring indicates some remaining impacts remain. This site may contain some residual contamination that is either associated with background concentrations or comes from sources other than a release from this site. There are other local, state and federal environmental cleanup authorities that may be needed to achieve a high level of ecological value. EPA, local environmental groups, NJDEP and local government need to continue a dialog on the general area and find appropriate responses outside of CERCLA.

This site does have long term operation, maintenance and monitoring responsibilities by the PRPs. It is possible that future erosion could expose waste and contaminants, or groundwater monitoring could suggest further action. The long term responsibility of the PRPs is important for the protection of the site.

Institutional and Access Controls: NJDEP has placed a Classification Exception Area at the site, which restricts groundwater use. Operating procedures, as specified in the operation and maintenance manual for the site, impose other restrictions of land and resource use that protect the engineered controls and minimize the potential for human exposure to contamination. For instance, the only road to the landfill is gated and signaled, dissuading unauthorized access. There is a chain-link fence and gates located around the land perimeter of the site which are inspected on a regular basis. The treatment plant building, located within the landfill premises, is also fenced and gated, providing double protection to its equipment and control systems. The Raritan River and the Edmonds Creek Marsh Area serve as natural barriers which limit access in areas where it is impractical to locate a fence.

VIII. Recommendations and Follow-up Actions

This site is on an on-going operation and maintenance program which includes monitoring activities. As expected by the decision documents, these activities are subjected to routine modification and adjustment. This report contains no specific recommendations or follow-up actions necessary to protect human health or the environment.

IX. Protectiveness Statement(s)

The implemented remedy at the Kin-Buc Landfill Superfund Site protects human health and the environment by containing site contaminants. There is no exposure to human receptors from site contaminants and none are anticipated during the next five years.

X. Next Review

The third five-year review for the Kin-Buc Landfill Superfund Site should be completed before September 2009, five years after the date of this review.

Approved by:

William McCabe

George Pavlou, Director
Emergency and Remedial Response Division

9-30-04
Date

KIN-BUC LF

TABLES

Table 1: Chronology of Site Events

Events	Date
Municipal, industrial and hazardous waste disposal site owned by Inmar Associates, Inc.	1947 to 1971
Operated as a landfill under a lease to Kin-Buc, Inc.	1968 to 1976
Operated as a state-approved landfill for industrial (solid and liquid) and municipal wastes. Hazardous wastes were also accepted.	1971 to 1976
An estimated 70 million gallons of liquid waste and at least one million tons of solid waste were disposed of at the site.	1973 to 1976
NJDEPE revoked Kin-Buc's permit to operate because of violations to both state and federal environmental statutes.	1976
EPA's involvement with the site began during an investigation of an oil spill which revealed the discharge of hazardous substances.	1976
EPA filed initial charges against owners/operators under two environmental statutes.	1979
Under a partial settlement, Kin-buc, Inc. (and not the other defendants) agreed to install a landfill cap and initiate a monitoring program, but not to remediate the site or control further migration of contaminants.	1980
EPA began collection aqueous and oily leachate from the Pool C area for treatment and disposal.	1980
Emergency permit issued by NJDEP to send pre-treated aqueous phase leachate from Kin-Buc to the Middlesex County Utility Authority.	1981
Kin-Buc, Inc. assumed the Pool C removal operation from EPA.	1982
Final NPL listing.	1983
After failed negotiations, EPA issued a Unilateral Administrative Order (II-CERCLA-30102) against the initial 11 defendants requiring the ongoing removal program, a RI/FS, and operation and maintenance.	1983
PRPs conducted a RI/FS.	1983 to 1988
EPA sent information requests to approximately 400 companies deemed PRPs.	1984
EPA issued and amended Unilateral Administrative Order (II-CERCLA-60105) to update the 1983 order to require the use of recent RI/FS guidance.	1986
88-2087, Consent Decree were EPA recovered 5 million in past and response cost form approximately half of the 400 PRPs.	1988

First of two RODs is issued.	1988
PRPs conducted a Remedial Design for OU1	1988 to 1993
PRPs conducted a RI/FS for OU2	1989 to 1992
II-CERCLA-00114, for a RI/FS for OU 2, and the RD/RA for OU 1	1990
ROD for OU2 is issued	1992
II-CERCLA-93-0101, for the OU2 RD/RA (design, construction and O&M)	1992
PRPs conducted a Remedial Action for OU1	1993 to 1997
PRPs conducted a Remedial Design for OU2	1992 to 1994
PRPs conducted a Remedial Action for OU2	1994 to 1996
EPA completed first five-year review	1999
EPA issued an ESD for the work performed at Mound B	2001

Table 2: Contaminants

1988 ROD's Indicator Contaminants	1992 ROD's Chemicals of Concern
VOCs	**VOCs**
Benzene	Benzene
Vinyl Chloride	Carbon Disulfide
Chloroform	Chlorobenzene
1, 1-Dichloroethene	1,2-Dichloroethene
	Vinyl Chloride
	Xylene
	PAHs
	Naphthalene
	PHATHALATES
	Bis(2-Ethylhexyl)Phathalate
PESTICIDES/PCBs	**PESTICIDES/PCBs**
PCBs	4,4-DDT
	PCBs
METALS	**METALS**
Arsenic	Antimony
Cadmium	Arsenic
Lead	Barium
	Beryllium
	Cadmium
	Manganese
	Nickel
	Vanadium

Table 3: ARARs and TBCs for groundwater that were presented in the Human Health Risk Assessment (Table 4-2)

Chemical	NJSDWA MCLs	NJAC Groundwater Stds.	USEPA MCL	USEPA PMCL	USEPA MCLG
Benzene	1.0 e-3	1.0 e-3	5.0 e-3		0.0 e+0
Carbon disulfide					
Chlorobenzene	-----	4.0 e-3	-----		-----
1,2-dichloroethene	7.0 e-2	1.0 e-2	7.0 e-2		7.0 e-2
Vinyl chloride	2.0 e-3	5.0 e-3	2.0 e-3		0.0 e+0
Xylene	1.0 e+0	4.0 e-2	10		10
Napthalene	3.0 e-2				
bis(2-ethylhexyl)phthalate		3.0 e-2			
PCBs	5.0 e-4	5.0 e-4	5.0 e-4		0.0 e+0
4,4'-DDT		1.0 e-4			
Antimony	6.0 e-3		6.0 e-3		6.0 e-3
Arsenic	5.0 e-2	5.0 e-2	1.0 e-2		0.0 e+0
Barium	2.0 e+0	1.0 e+0	2.0 e+0		2.0 e+0
Beryllium	4.0 e-3		4.0 e-3		4.0 e-3
Cadmium	5.0 e-3	1.0 e-2	5.0 e-3		5.0 e-3
Copper	1.3 e+0				1.3 e+0
Manganese					
Nickel	-----				1.0 e-1
Vanadium					

*Shaded cells represent values that have changed. Concentrations are reported in units of parts per million (ppm).

Table 4: ARARs and TBCs for surface water that were presented in the Human Health Risk Assessment (Tables 4-3).

Chemical	NJAC 7:9-4 Surface Water Criteria	Freshwater		Salt Water		Human Health	
		Max.	Cont.	Max.	Cont.	Water & Organism	Water Only
Benzene	1.5 e-4					2.2 e-3	5.1 e-2
Carbon disulfide						---	
Chlorobenzene	2.2 e-2					6.8 e-1	2.1 e+1
1,2-dichloroethene						---	---
Vinyl chloride	8.3 e-5					2.0 e-3	5.3 e-1
Xylene							
Napthalene							
bis(2-ethylhexyl)phthalate	1.76 e-3					1.2 e-3	2.2 e-3
PCBs	1.4 e-5		1.4 e-5		3.0 e-5	6.4 e-8	6.4 e-8
4,4'-DDT	1.0 e-6	1.1 e-3	1.0 e-6	1.3 e-4	1.0 e-6	2.2 e-7	2.2 e-7
Antimony						5.6 e-3	6.4 e-1
Arsenic	1.7 e-5	3.4 e-1	1.5 e-1	6.9 e-2	3.6 e-2	1.8 e-5	1.4 e-4
Barium	2.0 e+0						
Beryllium						see MCL	
Cadmium	1.0 e-2	2.0 e-3	2.4 e-4	4.0 e-2	8.8 e-3	see MCL	
Copper		1.3 e-2	9.0 e-3	4.8 e-3	3.1 e-3	1.3 e+0	
Manganese	1.0 e-1						
Nickel	5.16 e-1	4.7 e-1	5.2 e-2	7.4 e-2	8.2 e-3	6.1 e-1	4.6 e+0
Vanadium							

*Shaded cells represent values that have changed. Concentrations are reported in units of parts per million (ppm).

Groundwater and Surface Data Summary
Years 2000 to 2003

Bedrock Wells Inside the Slurry Wall
W-1R

Chemical	2000	2001	2002	2003
Benzene	44U	44U	22U	22U
Carbon disulfide				
Chlorobenzene	28U	28U	30U	30U
1,2-dichloroethene	50U	50U	25U	25U
Vinyl chloride	100U	100U	50U	50U
Xylene				
Napthalene	0.320U	0.300U	0.360U	1.700U
bis(2-ethylhexyl)phthalate	0.040U	0.300U	0.360U	2.400U
PCBs [1]	0.0047U	0.0005U	0.0095U	0.00005U
4,4'-DDT	0.00047U	0.00005U	0.0034	0.000005U
Antimony	0.01U	0.006U	0.5U	0.2U
Arsenic	0.056	0.004U	1U	0.034U
Barium	0.48	0.24	0.0729B	0.0778
Beryllium	0.006	0.0096	0.125U	0.0077U
Cadmium	0.0012U	0.001U	0.250U	0.0164U
Copper				
Manganese	37.2	41.8	58.5	53.6
Nickel	1.4	1.3	1.38	1.42
Vanadium	0.014	0.002U	0.150U	0.06U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Inside the Slurry Wall
W-3RR

Chemical	2000	2001	2002	2003
Benzene	0.26	0.089D	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.028U	0.014U	0.012	0.014
1,2-dichloroethene	0.05U	0.025U	0.005U	0.005U
Vinyl chloride	0.1U	0.05U	0.01U	0.01U
Xylene				
Napthalene	0.015U	0.0061	0.0016U	0.0035U
bis(2-ethylhexyl)phthalate	0.0019U	0.0011U	0.0009U	0.0051U
PCBs [1]	0.00047U	0.00095U	0.00005U	0.00005U
4,4'-DDT	0.000047U	0.000095U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.032	0.004U	0.2U	0.2U
Barium	1.9	1.5	1.35	1.45
Beryllium	0.001U	0.0011	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	2.4	2.9	2.94	3.05
Nickel	0.015	0.006	0.05U	0.05U
Vanadium	0.0044	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.
D - Compound analyzed at a secondary dilution factor.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Inside the Slurry Wall
W-5R

Chemical	2000	2001	2002	2003
Benzene	0.044U	0.004U	0.044U	0.022U
Carbon disulfide				
Chlorobenzene	0.028U	0.003U	0.06U	0.03U
1,2-dichloroethene	0.05U	0.005U	0.05U	0.025U
Vinyl chloride	0.1U	0.01U	0.1U	0.05U
Xylene				
Napthalene	0.0037U	0.0016U	0.0016U	0.0033U
bis(2-ethylhexyl)phthalate	0.0009U	0.0009	0.0009U	0.0048U
PCBs [1]	0.000065U	0.00005U	0.00005U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.1U	0U
Arsenic	0.013	0.004U	0.2U	0.2U
Barium	0.96	1.2	0.567	0.594
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	1.4	1.4	1.67	1.71
Nickel	0.0077	0.0092	0.05U	0.05U
Vanadium	0.0026	0.004	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Inside the Slurry Wall
W-7R

Chemical	2000	2001	2002	2003
Benzene	0.0044U	0.004U	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.0028U	0.003U	0.006U	0.006U
1,2-dichloroethene	0.005U	0.005U	0.005U	0.005U
Vinyl chloride	0.01U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0035U
bis(2-ethylhexyl)phthalate	0.0009	0.0009U	0.0009U	0.0051U
PCBs [1]	0.000065U	0.00005U	0.00005U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.014	0.004U	0.2U	0.2U
Barium	0.6	1.4	0.438	0.348
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	0.69	0.31	0.568	0.589
Nickel	0.004	0.0041	0.05U	0.05U
Vanadium	0.0026	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Inside the Slurry Wall
W-9R

Chemical	2000	2001	2002	2003
Benzene	0.018U	0.004U	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.011U	0.003U	0.006U	0.006U
1,2-dichloroethene	0.02U	0.005U	0.005U	0.005U
Vinyl chloride	0.04U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0033U
bis(2-ethylhexyl)phthalate	0.0054	0.0009U	0.0009U	0.0049U
PCBs [1]	0.00023U	0.000005U	0.00005U	0.00005U
4,4'-DDT	0.000023U	0.00001U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.004U	0.004U	0.2U	0.1U
Barium	0.34	0.24	0.0984	0.0926
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	1.5	1.5	1.44	1.23
Nickel	0.018	0.022	0.0157B	0.0147U
Vanadium	0.002U	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Outside the Slurry Wall
W-2R

Chemical	2000	2001	2002	2003
Benzene	22U	44U	22U	0.088U
Carbon disulfide				
Chlorobenzene	14U	28U	30U	0.12U
1,2-dichloroethene	25U	50U	25U	0.1U
Vinyl chloride	50U	100U	50U	0.2U
Xylene				
Napthalene	0.3U	0.370U	0.036U	0.170U
bis(2-ethylhexyl)phthalate	0.037U	0.370U	0.360U	0.240U
PCBs [1]	0.005U	0.00051U	0.0048U	0.00047U
4,4'-DDT	0.0005U	0.000051U	0.00091U	0.000047U
Antimony	0.01U	0.006U	0.5U	0.1U
Arsenic	0.044	0.004U	1.U	0.2U
Barium	0.24	0.23	0.0973B	0.465
Beryllium	0.035	0.049	0.0351B	0.025U
Cadmium	0.0012U	0.001U	0.25U	541
Copper				
Manganese	37.7	45.3	36.6	13.6
Nickel	2.9	3.6	2.41	0.0361U
Vanadium	0.036	0.024	0.150U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Outside the Slurry Wall
W-4R

Chemical	2000	2001	2002	2003
Benzene	0.021	0.014	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.0028U	0.003U	0.006	0.006U
1,2-dichloroethene	0.005U	0.005U	0.005U	0.005U
Vinyl chloride	0.01U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0011J	0.0016U	0.0033U
bis(2-ethylhexyl)phthalate	0.0056	0.0009U	0.00089J	0.0048U
PCBs [1]	0.0005U	0.00051U	0.00005U	0.00005U
4,4'-DDT	0.00005U	0.000051U	0.0000043J	0.000005U
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.0074	0.004U	0.2U	0.2U
Barium	4.6	3.5	3.15	2.5
Beryllium	0.001U	0.0011	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	2.1	1.9	1.94	2.15
Nickel	0.0026	0.0068	0.05U	0.05U
Vanadium	0.002U	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.
J - Value is estimated.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Outside the Slurry Wall
W-6R

Chemical	2000	2001	2002	2003
Benzene	0.044U	0.044U	0.180	0.013
Carbon disulfide				
Chlorobenzene	0.028U	0.028U	0.06U	0.058
1,2-dichloroethene	0.05U	0.05U	0.05U	0.025U
Vinyl chloride	0.1U	0.1U	0.1U	0.05U
Xylene				
Napthalene	0.00038J	0.0016U	0.00042J	0.033U
bis(2-ethylhexyl)phthalate	0.0012	0.0009U	0.0009U	0.049U
PCBs [1]	0.000065U	0.00005U	0.000097U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.1U	0U
Arsenic	0.02	0.004U	0.2U	0.2U
Barium	0.61	0.8	0.316	0.22
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	0.0095	0.034	1.02	0.075U
Nickel	0.021	0.017	0.05	0.0514
Vanadium	0.0075	0.0067	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Outside the Slurry Wall
W-8RR

Chemical	2000	2001	2002	2003
Benzene	0.0044U	0.004U	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.0028U	0.003U	0.006U	0.006U
1,2-dichloroethene	0.005U	0.005U	0.005U	0.005U
Vinyl chloride	0.01U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0034U
bis(2-ethylhexyl)phthalate	0.0009U	0.0009U	0.00025J	0.0049U
PCBs [1]	0.000065U	0.00005U	0.00005U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.10U	0.1U
Arsenic	0.0059	0.004U	0.2U	0.2U
Barium	0.56	0.64	0.566	0.573
Beryllium	0.001U	0.0012	0.025U	0.025U
Cadmium	0.0012	0.001U	0.05U	0.05U
Copper				
Manganese	0.79	0.67	0.693	1.01
Nickel	0.042	0.0067	0.05U	0.05U
Vanadium	0.002U	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Outside the Slurry Wall
W-10R

Chemical	2000	2001	2002	2003
Benzene	0.0044U	0.004U	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.0028U	0.003U	0.006U	0.006U
1,2-dichloroethene	0.005U	0.005U	0.005U	0.005U
Vinyl chloride	0.01U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0033U
bis(2-ethylhexyl)phthalate	0.0048	0.000072J	0.0012	0.0048U
PCBs [1]	0.000065U	0.00005U	0.00005U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.004U	0.004U	0.2U	0.2U
Barium	0.38	0.5	0.0552	0.0757U
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	0.29	0.3	0.191	0.322
Nickel	0.0063	0.021	0.05U	0.05U
Vanadium	0.002U	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Low Lying Area
WE-3R

Chemical	2000	2001	2002	2003
Benzene	0.022U	0.088U	0.022U	0.022U
Carbon disulfide				
Chlorobenzene	0.014U	0.056U	0.03U	0.03U
1,2-dichloroethene	0.025U	0.1U	0.025U	0.025U
Vinyl chloride	0.05U	0.2U	0.05U	0.05U
Xylene				
Napthalene	0.0016U	0.00025J	0.0016U	0.0034U
bis(2-ethylhexyl)phthalate	0.0016	0.00088J	0.0009U	0.0049U
PCBs [1]	0.000065U	0.00005U	0.00005U	0.00024U
4,4'-DDT	0.00001U	0.00001U	0.0000061	0.000024U
Antimony	0.006U	0.006U	0.10U	0.10U
Arsenic	0.014	0.0082	0.02U	0.2U
Barium	0.7	0.26	0.154	0.161
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	0.82	0.75	0.779	0.794
Nickel	0.0049	0.024	0.0728	0.0309B
Vanadium	0.002U	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Low Lying Area
WE-10R

Chemical	2000	2001	2002	2003
Benzene	0.022U	0.022U	0.022U	0.009U
Carbon disulfide				
Chlorobenzene	0.014U	0.014U	0.03U	0.012U
1,2-dichloroethene	0.025U	0.025U	0.025U	0.01U
Vinyl chloride	0.05U	0.05U	0.05U	0.02U
Xylene				
Napthalene	0.0016U	0.0016U	0.014B	0.0034U
bis(2-ethylhexyl)phthalate	0.0017	0.00049J	0.0009U	0.0049U
PCBs [1]	0.000065U	0.000052U	0.00005U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.08	0.091	0.11B	0.12B
Barium	0.64	0.24	0.1	0.111
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	2.6	2.7	2.61	2.82U
Nickel	0.25	0.95	0.18B	0.05U
Vanadium	0.002U	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Mound B
WE-5R

Chemical	2000	2001	2002	2003
Benzene	0.022U	0.022U	0.022U	0.022U
Carbon disulfide				
Chlorobenzene	0.014U	0.014U	0.03U	0.03U
1,2-dichloroethene	0.025U	0.025U	0.025U	0.025U
Vinyl chloride	0.05U	0.05U	0.05U	0.05U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0035U
bis(2-ethylhexyl)phthalate	0.0009U	0.0009U	0.0009U	0.0051U
PCBs [1]	0.000065U	0.00005U	0.000095U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000007	0.0000067
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.004U	0.004U	0.2U	0.2U
Barium	0.53	0.82	0.0976	0.0975
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	1.2	1.1	1.08	1.1
Nickel	0.039	0.43	0.0326B	0.0282B
Vanadium	0.002U	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Mound B
WE-6R

Chemical	2000	2001	2002	2003
Benzene	0.044U	0.022U	0.022U	0.022U
Carbon disulfide				
Chlorobenzene	0.028U	0.014U	0.03U	0.03U
1,2-dichloroethene	0.05U	0.025U	0.025U	0.025U
Vinyl chloride	0.1U	0.05U	0.05U	0.05U
Xylene				
Napthalene	0.0037U	0.0016U	0.0016U	0.0033U
bis(2-ethylhexyl)phthalate	0.0009U	0.0011	0.0009U	0.0049U
PCBs [1]	0.000065U	0.000099U	0.0006U	0.00094U
4,4'-DDT	0.0000058J	0.00001U	0.000024U	0.000094U
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.015	0.004U	0.2U	0.2U
Barium	1.2	0.67	0.47	0.633
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	1.2	1.1	0.89	1.1
Nickel	0.028	0.082	0.035B	0.0137B
Vanadium	0.0024	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Bedrock Wells Mound B
WE-7R

Chemical	2000	2001	2002	2003
Benzene	0.0044U	0.004U	0.022U	0.004U
Carbon disulfide				
Chlorobenzene	0.0028U	0.003U	0.03U	0.006U
1,2-dichloroethene	0.005U	0.005U	0.025U	0.005U
Vinyl chloride	0.01U	0.01U	0.05U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0034U
bis(2-ethylhexyl)phthalate	0.0056	0.0005J	0.0009U	0.0049U
PCBs [1]	0.000065U	0.000051U	0.00005U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.034	0.004U	0.2U	0.2U
Barium	0.95	0.11	0.088	0.0704
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	1.8	2	1.81	2.95
Nickel	0.029	0.66	0.13	5.82
Vanadium	0.0068	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Upgradient Bedrock Well
WE-114DR

Chemical	2000	2001	2002	2003
Benzene	0.0044U	0.004U	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.0028U	0.003U	0.006U	0.006U
1,2-dichloroethene	0.005U	0.005U	0.005U	0.005U
Vinyl chloride	0.01U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0033U
bis(2-ethylhexyl)phthalate	0.0009U	0.0009U	0.0009U	0.0048U
PCBs [1]	0.000065U	0.00005U	0.00005U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.006U	0.006U	0.1U	0.1U
Arsenic	0.004U	0.004U	0.2U	0.2U
Barium	0.34	0.19	0.0534	0.572
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	0.49	0.42	0.468	0.567
Nickel	0.0043	0.0042	0.05U	0.05U
Vanadium	0.002U	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Surface Water Wells - Raritan River
SW-01

Chemical	2000	2001	2002	2003
Benzene	0.004U	0.004U	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.003U	0.003U	0.006U	0.006U
1,2-dichloroethene	0.005U	0.005U	0.005U	0.005U
Vinyl chloride	0.01U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0033U
bis(2-ethylhexyl)phthalate	0.0009U	0.0009U	0.0009U	0.0049U
PCBs [1]	0.000065U	0.00005U	0.00005U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.0063U	0.006U	0.1U	0.1U
Arsenic	0.004U	0.004U	0.2U	0.2U
Barium	0.038	0.68	0.11	0.0541
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	0.078	0.14	0.25	0.0775
Nickel	0.0035	0.0041	0.05	0.05
Vanadium	0.0032	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Surface Water Wells - Raritan River
SW-02

Chemical	2000	2001	2002	2003
Benzene	0.004U	0.004U	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.003U	0.003U	0.006U	0.006U
1,2-dichloroethene	0.005U	0.005U	0.005U	0.005U
Vinyl chloride	0.01U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0033U
bis(2-ethylhexyl)phthalate	0.0009U	0.0009U	0.0009U	0.0049U
PCBs [1]	0.000065U	0.00005U	0.00005U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.0063U	0.006U	0.01U	0.1U
Arsenic	0.004U	0.004U	0.2U	0.2U
Barium	0.039	0.68	0.067	0.0456
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	0.081	0.13	0.11	0.105
Nickel	0.0037	0.0034	0.05U	0.05U
Vanadium	0.0041	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

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[1] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Surface Water Wells - Raritan River
SW-03

Chemical	2000	2001	2002	2003
Benzene	0.004U	0.004U	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.003U	0.003U	0.006U	0.006U
1,2-dichloroethene	0.005U	0.005U	0.005U	0.005U
Vinyl chloride	0.01U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0034U
bis(2-ethylhexyl)phthalate	0.0009U	0.0009U	0.0009U	0.0049U
PCBs [1]	0.000065U	0.00005U	0.000061U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.0063U	0.006U	0.1U	.01U
Arsenic	0.004U	0.004U	0.2U	0.2U
Barium	0.052	0.69	0.053	0.046
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	0.093	0.12	0.067B	0.0743B
Nickel	0.0054	0.0041	0.05U	0.05U
Vanadium	0.0067	0.002U	0.03U	0.03U

Notes:

Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

Surface Water Wells - Raritan River
SW-04

Chemical	2000	2001	2002	2003
Benzene	0.004U	0.004U	0.004U	0.004U
Carbon disulfide				
Chlorobenzene	0.003U	0.003U	0.006U	0.006U
1,2-dichloroethene	0.005U	0.005U	0.005U	0.005U
Vinyl chloride	0.01U	0.01U	0.01U	0.01U
Xylene				
Napthalene	0.0016U	0.0016U	0.0016U	0.0034U
bis(2-ethylhexyl)phthalate	0.0009U	0.0009U	0.0009U	0.005U
PCBs [1]	0.000065U	0.00005U	0.000052U	0.00005U
4,4'-DDT	0.00001U	0.00001U	0.000005U	0.000005U
Antimony	0.0063U	0.006U	0.1U	0.1U
Arsenic	0.004U	0.004U	0.2U	0.2U
Barium	0.046	0.66	0.048	0.0461
Beryllium	0.001U	0.001U	0.025U	0.025U
Cadmium	0.001U	0.001U	0.05U	0.05U
Copper				
Manganese	0.08	0.12	0.07	0.0764
Nickel	0.0037	0.0053	0.05	0.05
Vanadium	0.0057	0.002U	0.03U	0.03U

Notes:

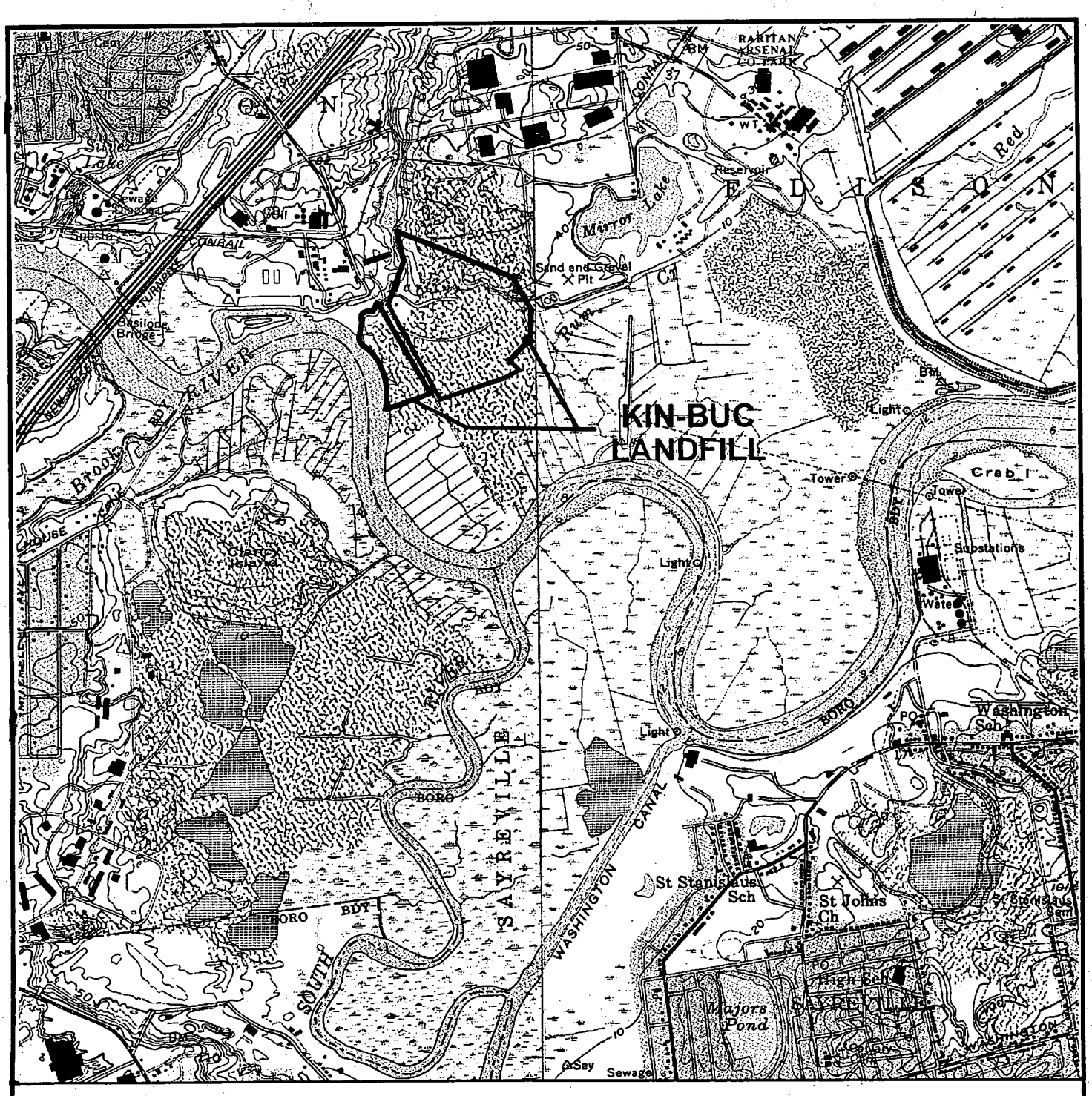
Concentrations are reported in units of parts per million (ppm).
U - Compound was analyzed for, but not detected.
B - Value is greater than or equal to the instrument detection limit, but less than the quantitation limit.

[1/] The highest among 1016, 1221, 1232, 1242, 1248, 1254, and 1260

ATTACHMENTS

List of Documents Reviewed

1. Five-Year Review Report for the Kin-Buc Landfill Superfund Site - February 1999
2. Record of Decision for the Kin-Buc Landfill Superfund Site - September 1988
3. Record of Decision for the Kin-Buc Landfill Superfund Site - September 1992
4. OU2 Remedial Investigation/Feasibility Study
5. Operation and Maintenance Manual - August 1996
6. Monitoring Reports
   - Fourth Quarter/Annual for 2003
   - Fourth Quarter/Annual for 2002
   - Fourth Quarter/Annual for 2001
   - Third Quarter, 2001
   - Fourth Quarter/Annual for 2000
   - Fourth Quarter/Annual for 1999
   - Third Quarter, 1999
   - Second Quarter, 1999
   - First Quarter, 1999
7. OU1 Wetlands Monitoring Reports, 1999 to 2002
8. OU2 Wetlands Monitoring Reports, 1999 to 2000
9. Biota Monitoring Reports, 1999 to 2003
10. Discharge Monitoring Reports - sample, 1999 to 2003



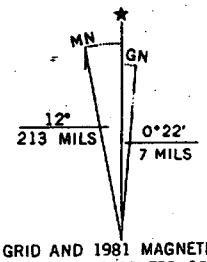
SOURCE:

SOUTH AMBOY/NEW BRUNSWICK, NEW JERSEY
7.5 MINUTE QUADRANGLE
CONTOUR INTERVAL = 10 FEET

2000' 0 2000'

Approximate Scale: In Feet

QUADRANGLE LOCATION



UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

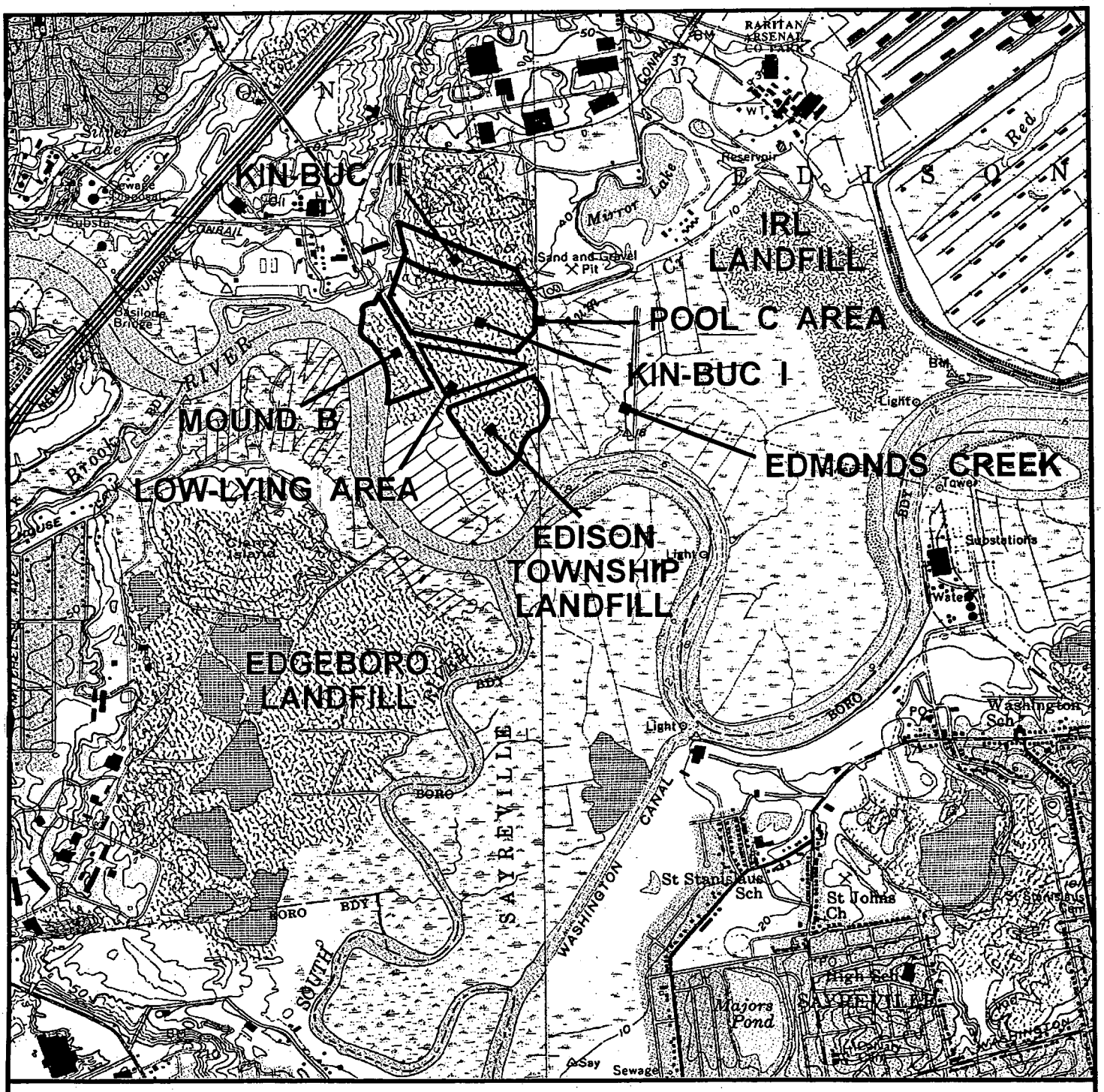
01/28/03 CRA-54-TLF
23796005/23796B01.CDR

SCA SERVICES, INC.
KIN-BUC LANDFILL SITE
EDISON, NEW JERSEY
FOURTH QUARTER/ANNUAL MONITORING REPORT

SITE LOCATION

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 1



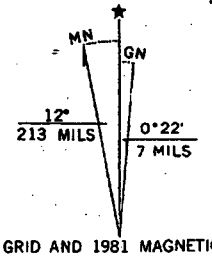
SOURCE:

SOUTH AMBOY/NEW BRUNSWICK, NEW JERSEY
7.5 MINUTE QUADRANGLE
CONTOUR INTERVAL = 10 FEET

2000' 0 2000'

Approximate Scale: In Feet

QUADRANGLE LOCATION



UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

01/30/03 CRA-54-TLF
23796005/23796B02.CDR

SCA SERVICES, INC.
KIN-BUC LANDFILL SITE
EDISON, NEW JERSEY

FOURTH QUARTER/ANNUAL MONITORING REPORT

SITE AND SURROUNDING AREA

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FIGURE 2